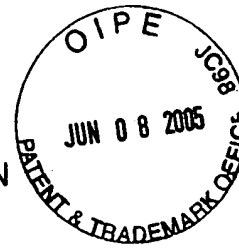


## SUBSTITUTE SPECIFICATION



### SPORTS SHOE WITH IMPACT ABSORBER SYSTEM

#### SUMMARY OF THE INVENTION

**[0001]** The present invention is directed to a sports shoe providing an impact absorber system, for absorbing an impact generated by an athlete's feet. The absorption system comprises resilient or elastic tubular elements grouped in parallel, and arranged over the sole region of the shoe, generally on the heel region, although it can be inserted in two or three sole regions, in this last option occupying almost all shoe sole.

**[0002]** The impact absorber system of the present invention contributes to correcting an athlete's paces, preserving the athlete's efficiency and security, and maintaining a longer shoe life.

**[0003]** The tubular elements can be manufactured with an elastic, resilient or compound material. The tubular elements are arranged in parallel with one another and disposed transversally to the longitudinal axis of the shoe, adjacent or very close to one another.

**[0004]** The tubular elements are cylinders of elliptical cross-section that can be manufactured in a cylinder shape of circular cross-section, or be manufactured in any other compound cross-sectional shape.

**[0005]** The preferred material for the manufacture of the sports shoe impact absorber system of the present invention is plastic. Other materials can be used, provided that they meet the activity for which the shoe will be worn.

**[0006]** The activity for which the shoe will be worn dictates that the tubular elements wall thickness and respective diameters, the size of each tubular element, its form, and the distance between the tubular elements.

**[0007]** Each set of three tubular elements is closed on laterally opposite ends by walls. The walls statically and dynamically stabilize each set, keeping them functionally firm while the shoe is being worn to prevent distortion, namely, the shoe inclination due to user misstep during sports activities.

**[0008]** The interior of each tubular element can contain air or any other material that enhances performance for particular applications.

**[0009]** The sports shoe with impact absorber system of the present invention has a design proportional to the user's weight and the different types of activities engaged in by the user.

**[0010]** The invention will be better understood and appraised by way of the drawings, represented by figures and the description which follows.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0011]** Figure 1 is a perspective view of the sports shoe of the invention, showing the position of the impact absorber set in relation to the sports shoe;

**[0012]** Figure 2 is a perspective view of the absorber set and the shoe insole;

**[0013]** Figure 3 is a front view of the absorber set bounded by two opposed lateral walls;

**[0014]** Figures 4, 5 and 6 illustrate positions of the impact absorber sets, respectively in the heel area, in the heel and front third area, and throughout the entire user foot plant;

**[0015]** Figure 7 illustrates the transition of the absorber set from being at rest to being under pressure;

**[0016]** Figures 8, 9 and 10 are side views of the effect of a user's foot on the absorber set under three different conditions;

**[0017]** Figure 11 is a rear view of a user's foot before and after stepping on the absorber set;

**[0018]** Figure 12 is a rear view of a user's foot applying pressure to the absorber set, showing the deformations that result from the pressure.

#### DETAILED DESCRIPTION OF THE INVENTION

**[0019]** Figure 1 illustrates a preferred embodiment of the present invention in which the impact absorber system is embedded within the sole 1 of a sports shoe. The absorber set is disposed on the heel region, where the higher weight applied to the shoe by the user's foot is concentrated.

**[0020]** In the sports shoe, the insole 2 occupies the front two thirds of the shoe, and the shoe body 3 provides an upper part of the shoe.

**[0021]** Figure 2 illustrates the shoe impact absorber set 4, showing tubular elements 6, 7 and 8, which form the impact absorber system, and the side walls 5, on opposite side ends of the absorber set 4 and plurality of tubular elements. The side walls 5 stabilize the shoe against the resilient deformation of the tubular elements 6, 7 and 8, and serve as a housing for the absorber set 4.

**[0022]** Each tubular element 6, 7, 8 can be manufactured in different sizes, thicknesses and configurations from one another, and be fabricated from plastics, resin, flexible polymers, or any other materials, for example, compound application for elastic and resilient materials that will be invented that can perform the functions they exert in the shoe.

**[0023]** Although the figures illustrate an absorber set 4 having three tubular elements, the absorber set can be manufactured with a different number of tubular elements.

**[0024]** In one embodiment of the present invention, the tubular element 6 receives the initial load of the user's foot, and performs a transition to the central tubular element 7, which receives the main impact absorption, since the load received in this [tubular element] is of highest intensity. Tubular element 8 provides the final absorption, when the user's foot no longer exerts pressure on the sports shoe.

**[0025]** Figure 3 illustrates a front view of the side walls 5, which enclose the absorber set 4, providing balance and stability to the same, and transferring this stability to the user.

**[0026]** Figure 4 illustrates a first embodiment of the present invention in which the absorber set 4 is disposed at position A, the heel, in relation to the user's foot. The absorber set 4 thus absorbs the impact of the user's step at the beginning of the user's step.

**[0027]** Figure 5 illustrates a second embodiment of the present invention in which a pair of absorber sets 4 is disposed at the positions B and C, the heel and front third of the user's foot. The absorber set 4, thus absorbs the impact of the user's step at the beginning and end of the user's step.

**[0028]** Figure 6 illustrates a third embodiment of the present invention in which three absorber sets 4 are disposed at positions D, E and F of the user's foot, covering

practically all user's foot sole, thus receiving the full impact of the user's foot pressure through the entire user's step.

**[0029]** Figure 7 illustrates the transition of the absorber set 4 from the tubular elements without pressure to being under pressure. When the absorber set 4 is not under pressure, the material inside each tubular element is in an uncompressed state H. When the absorber set 4 is under pressure, the material in each tubular element is in a compressed state J. The substance of the internal material of the tubular elements of the absorber sets 4 of the present invention can be different and tailored to the specific type of activity or application for which the sports shoe will be used.

**[0030]** Figures 8, 9 and 10 illustrate three conditions of dynamic impact of the user's foot over the tubular elements 6, 7 and 8 which generate different pressures and deformations on the tubular elements. In particular, Figure 8 shows the user's foot at the moment of touching the absorber set 4; Figure 9 shows the user's foot compressing the absorber set 4 completely, and Figure 10 shows the user's foot decreasing pressure on the absorber set 4.

**[0031]** Figure 11 illustrates schematically the absorber set 4 without pressure being applied by the user's foot with the sheet K before impact and after impact. Figure 12 illustrates the absorber set 4 under the user's foot pressure with the sheet K during the deformation, owing to the impact.

**[0032]** Example embodiments of the present invention have now been described in accordance with the above advantages. It will be appreciated that these examples are merely illustrative of the invention. Many variations and modifications will be apparent to those skilled in the art.